d his

(FILE 'HOME' ENTERED AT 11:15:47 ON 18 DEC 1999)

FILE 'REGISTRY' ENTERED AT 11:15:52 ON 18 DEC 1999
L1 97 (0<CU<5 AND 0<MG<6 AND 0<LI<1 AND 50<AL)/MAC

FILE 'HCA' ENTERED AT 11:16:30 ON 18 DEC 1999
L2 130 L1
L3 4476 (ALUMINUM OR AL) AND (COPPER OR CU) AND (LITHIUM OR LI) AND (MA
L4 63 L2 AND L3
SELECT L4 1- IPC
L5 371029 E1-E28
L6 504 L5 AND L3
L7 0 (ALUMINUM RO AL)(1A)(BASE? OR ALLOY OR BALANC? OR REMAIN? OR RE
L8 125719 (ALUMINUM OR AL)(1A)(BASE? OR ALLOY OR BALANC? OR REMAIN? OR RE
L9 328 L6 AND L8
L10 206 L9 AND (CR OR V OR TI OR ZR) AND (MN OR NI OR FE OR HF)
L11 181 L10 NOT L4
L12 165 L11 AND (ZN OR AG OR SI)
E RIOJA ROBERTO/IN,AU
L13 14 E5-6
E STALEY JAMES/IN,AU
L14 35 E8-E9
E BRAY GARY/AU,IN
L15 9 E5-E7
L16 56 L13 OR L14 OR L15
L17 17 L16 AND L8 AND (CR OR V OR TI OR ZR) AND (MN OR NI OR FE OR HF)
L18 10 L17 NOT (L4 OR L12)

AN 131:160372 HCA
TI High-strength **aluminum-magnesium** alloys for application in welded construction
IN Haszler, Alfred Johann Peter; Sampath, Desikan
PA Hoogovens Aluminium Walzprodukte G.m.b.H., Germany
SO PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9942627	A1	19990826	WO 1999-EP1011	19990218

W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRAI EP 1998-200560 19980220

AB The **Al-Mg** alloys suitable for extrusions or rolled strip contain **Mg** >3.0 to 4.5 (esp. 3.5-4.5), Mn 0.4-1.2, Zn 0.4-1.7, Zr 0.05-0.25, Cr .ltoreq.0.3, Ti .ltoreq.0.2, V .ltoreq.0.2, **Li** .ltoreq.0.5, Sc .ltoreq.0.5, Fe .ltoreq.0.5, Si .ltoreq.0.5, **Cu** .ltoreq.0.15, and Ag .ltoreq.0.4% with impurities .ltoreq.0.05 each and .ltoreq.0.15% total. The **Al-Mg** alloy is suitable for manuf. of high-strength containers or welded structural parts, esp. for operation near 80-100.degree.. The alloy ingot is typically preheated at 300-530.degree. to decrease segregation, hot rolled, and optionally finished by cold rolling, and the resulting strip is heat treated for high-strength applications and corrosion resistance. The typical alloy for manuf. of the strip 1.2 mm thick with longitudinal tensile strength of 292 MPa contains **Mg** 3.9, Mn 0.74, Zn 0.53, Zr 0.13, Cr 0.05, Ti 0.02, Fe 0.31, Si 0.14, and **Cu** 0.05%. The alloy strength and ductility are comparable to those of the low-Zn AA 5083 **Al**-alloy strip susceptible to sensitized and intergranular corrosion.

AN 130:240658 HCA
TI **Aluminum** alloys for extrusion and their production method including casting process with element addition
IN Kikuchi, Masao; Saga, Makoto
PA Nippon Steel Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 11061312	A2	19990305	JP 1997-232545	19970828

AB The **Al** alloys contain Si .ltoreq.1.2, Fe .ltoreq.1.5, **Cu** .ltoreq.0.50, Mn .ltoreq.1.5, **Mg** 2.0-8.0, Cr .ltoreq.0.35, Zn .ltoreq.0.50, and Ti .ltoreq.0.20% and have no. of crystals having max. diam. .gtoreq.40 .mu.m .ltoreq.200/mm2 in cross section of billets for extrusion and no. of crystals having ratio of (max. diam)/(min. diam.) .gtoreq.5.0 .ltoreq.100/mm2. Alternatively, the alloys contain (a) 0.2-1.5% each of Si and **Mg** or (b) **Cu** .ltoreq.3.0, **Mg** 0.2-3.0, and Zn 1.0-8.0% instead of the above ratio of each element. In the manuf. of the alloys by melting, casting, and soaking to form billets, 0.005-0.3% in total of Na, Sr, Sb, Ca, Te, Ba, **Li**, K, Bi, P, As, and/or Se is added during the casting process. The alloys have good extrusion property, mech. properties, corrosion resistance, and secondary workability even though they are manufd. by recycling scraps as raw materials.

AN 130:240657 HCA
TI **Aluminum** alloy strips and their production for automobile body panels
IN Kikuchi, Masao; Takada, Takeshi
PA Nippon Steel Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11061311	A2	19990305	JP 1997-232526	19970828

PI JP 11061311 A2 19990305 JP 1997-232526 19970828

AB The **Al** alloy strips contain Si .ltoreq.1.2, Fe .ltoreq.1.5, **Cu** .ltoreq.0.50, Mn .ltoreq.0.80, **Mg** 2.0-8.0, Cr .ltoreq.0.35, Zn .ltoreq.0.50, and Ti .ltoreq.0.20% and have no. of crystals having max. diam. .gtoreq.10 .mu.m .ltoreq.300/mm2 in cross section of rolling direction and no. of crystals having ratio of (max. diam)/(min. diam.) .gtoreq.3.5 .ltoreq.100/mm2. In the manuf. of the alloy strips, 0.005-0.3% in total of Na, Sr, Sb, Ca, Te, Ba, **Li**, K, Bi, P, As, and/or Se is added during casting process. The strips have improved moldability and corrosion resistance even though they are manufd. by recycling scraps as raw materials.

Examiner's Copy

AN 104:23136 HCA
TI **Aluminum-lithium** alloys
IN Sawtell, Ralph R.; Bretz, Philip E.; Hunt, Warren H.
PA Aluminum Co. of America, USA
SO Eur. Pat. Appl., 23 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 8

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 157600	A2	19851009	EP 1985-302169	19850328
	EP 157600	A3	19870916		
	EP 157600	B1	19920701		
	R: CH, DE, FR, GB, IT, LI, NL, SE				
	US 4648913	A	19870310	US 1984-594344	19840329
	AU 8538094	A1	19851003	AU 1985-38094	19850125
	AU 573683	B2	19880616		
	CA 1228490	A1	19871027	CA 1985-475903	19850307
	NO 8501267	A	19850930	NO 1985-1267	19850328
	BR 8501422	A	19851126	BR 1985-1422	19850328
	JP 60221543	A2	19851106	JP 1985-66407	19850329
	US 4897126	A	19900130	US 1988-213722	19880630
	US 5135713	A	19920804	US 1990-588410	19900926
PRAI	US 1984-594344	19840329			
	US 1984-685731	19841224			
	US 1988-149802	19880128			
	US 1988-172506	19880324			

AB High toughness in combination with tensile strength is obtained in aircraft alloys contg. **Li** 0.5-4, **Mg** 0-5.0, **Cu** 0-5.0, Zr 0-1.0, Mn 0-2.0, Zn 0-7, Fe <0.5, and Si <0.5%. The wrought bar or strip is soln.-treated, quenched, stretched >3%, and aged at 150-400.degree.F. Tensile strength of 50-85 kpsi is typically achieved with fracture toughness 25-75 kpsi-in0.5. Thus, **Al** alloy ingot contg. **Li** 1.73, **Cu** 2.63, and Zr 0.12% was homogenized 24 h at 1000.degree.F, and hot-rolled into plates 1 in. thick. The plate was soln. heat treated 1 h at 1025.degree.F, quenched in water at 70.degree.F, stretched 2 or 6%, and aged at 325 or 375.degree.F. Tensile strength and fracture toughness were higher after stretching to 6%, compared with 2%.

Examiner Copy

AN 107:119640 HCA
TI **Aluminum-lithium** alloys and method of making the same
IN Cho, Chul Won
PA Aluminum Co. of America, USA
SO PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 8

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 8703011	A1	19870521	WO 1986-US2545	19861119
	W: AU, BR, JP, NO				
	RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE				
	US 4806174	A	19890221	US 1985-793273	19851119
	AU 8768381	A1	19870602	AU 1987-68381	19861119
	BR 8606987	A	19871201	BR 1986-6987	19861119
	EP 247181	A1	19871202	EP 1987-900418	19861119
	EP 247181	B1	19911002		
	R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
	JP 63501883	T2	19880728	JP 1987-500396	19861119
	CA 1283565	A1	19910430	CA 1986-523324	19861119
	NO 8702996	A	19870917	NO 1987-2996	19870717
PRAI	US 1985-793273	19851119			
	US 1984-594344	19840329			
	WO 1986-US2545	19861119			

AB The low-d. alloys suitable for aircraft applications contain **Li** 0.5-4.0, **Mg** 0-5.0, **Cu** <5.0, Zr 0-1.0, Mn 0-2.0, Zn 0-7.0, and Fe and Si .ltoreq.0.5% each. A wrought product having an isotropic texture is manufd. by hot working into a preform without a dissoln. loss of grain-boundary ppts., followed by recrystn. of the preform and hot working for final shaping. The alloy is suitable for sheet manuf. and pptn. hardening. Thus, a cast ingot of **Al** alloy (contg. **Li** 1.73, **Cu** 2.63, and Zr 0.12%) was soaked 24 h at 1000.degree. F, and then hot-rolled into a plate (.apprx.0.25 in). The plate was soln.-treated 1 h at 1075.degree. F, quenched in water to 70.degree. F, and stretched for 2 or 6% elongation. Plate specimens were then heat-treated at 325 or 375.degree. F for artificial aging. Fracture toughness and tensile strength were improved more by stretch-forming for 6% than for 2%.

Examiner's Copy

AN 110:139903 HCA
TI **Aluminum-lithium** alloy for flat-rolled product
IN Young, Kenton P.; Bowers, Joel A.; Colvin, Edward L.; Westerlund, Robert A.
PA Aluminum Co. of America, USA
SO Eur. Pat. Appl., 6 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 281076	A1	19880907	EP 1988-103080	19880301
	EP 281076	B1	19920520		
	R: CH, DE, ES, FR, GB, IT, LI, NL, SE				
	US 4790884	A	19881213	US 1987-20600	19870302
	CA 1308630	A1	19921013	CA 1988-560077	19880229
	JP 63235454	A2	19880930	JP 1988-49453	19880302
	BR 8800903	A	19881011	BR 1988-903	19880302
PRAI	US 1987-20600	19870302			

AB The **Al-Li** alloys for sheets or plates showing a good formability without Luder's line defect contain **Li** 0.5-4.0, **Cu** and **Mg** .ltoreq.5.0 each, Zr .ltoreq.1.0, Mn .ltoreq.2.0, Zn .ltoreq.7.0, Fe and Si .ltoreq.0.5% each, and preferably .ltoreq.0.35% impurities. A flat-rolled product is soln. heat treated and quenched; preaged at 150-270.degree.F for >6 h; stretched without forming the Luder's line defect; and then aged to stabilize mech. properties. Thus, cast alloy ingot (contg. **Li** 2.3, **Cu** 2.7, and Zr 0.1%) was heated for 24 h at 1000.degree.F for homogenizing, hot-rolled to 0.162 in. thickness, cut, and cold-rolled into strips 0.063 in. thick. The strips were heated for 60 min at 1020.degree.F, quenched in water, preaged at 230.degree.F for 100 h, and cooled in air. The strips were then stretched 1% without showing the Luder's line defect. Without the preaging treatment the stretched strips showed the defect.

Examiner's Copy

AN 116:260506 HCA
TI Two-step aging of **aluminum-lithium** alloys
IN Rioja, Roberto J.; James, R. Steve
PA Aluminum Co. of America, USA
SQ U.S., 10 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 5076859	A	19911231	US 1989-457099	19891226

AB The soln. treated articles from **Al-Li** alloys are aged in the 1st stage for 0.1-100 h at 250-415 .degree.F, and then in the 2nd stage (esp. for 1-1000 h) at 100-330 .degree.F for improved strength and fracture toughness. The heat treatment process is suitable for the **Al** alloys contg.: (a) **Li** 0.2-5.0, **Mg** 0-5.0, **Cu** .ltoreq. 5.0, Ag 0-2, Zr 0-1.0, Mn 0-1.0, Zn 0-9.0, Fe .ltoreq. 0.5, and/or Si .ltoreq. 0.5%; or (b) **Li** 0.5-4.0, **Mg** 0.1-6.0, **Cu** .gtoreq. 0.6, Zn 0.05-12, Mn 0-0.8, Zr .ltoreq. 0.15, Ag 0.05-1, Fe .ltoreq. 0.5, and/or Si .ltoreq. 0.5%. Thus, the strip specimens from AA 2090 alloy were aged at 300-310 .degree.F and then at 212-250 .degree.F, and showed high fracture toughness insensitive to the tensile yield strength of 72-80 kpsi. When the alloy was aged only at 325 .degree.F, the fracture toughness decreased with the higher yield strength of 70-77 kpsi.

Examiner's Copy

AN 124:295966 HCA
TI Crystallography of heterogeneous S' & T1 precipitates in double aged **Al**-**Cu**-**Mg**-(**Li**) Alloys
AU Oezbilen, Sedat
CS Teknik Egitim Fakultesi, Gazi Univ., Ankara, Turk.
SO Turk. J. Eng. Environ. Sci. (1996), 20(2), 103-12
CODEN: TJESEC; ISSN: 1300-0160
DT Journal
LA Turkish
AB Alloys prepd. with a chem. compn. of **Al**-2.11%**Cu**-0.93% **Mg** (alloy-1) and **Al**-2.07%**Cu**-0.97%**Mg** -0.87%**Li** (alloy-2) were subjected to homogenization, water-quenching, natural aging for 3.15 .times. 107s & artificial aging at 463K for 2.16 .times. 104s & 8.64 .times. 104s (double aging). Selected samples were examd. in detail under TEM. For this purpose, bright & dark field images together with electron diffraction patterns taken from [001], [011], [012] & [111]Al-matrix directions were used. It was obsd. that there was an effect of alloying elements, namely **Li**, **Cu** , **Mg** on the nature & d. of lattice defects of dislocation loop type in **Al**-matrix during heat treatments. In alloy-2, **Li** & **Cu** atoms segregating on Frank & double-arc contrast, prismatic loops cause the formation of T1 (Al2CuLi) ppts. during double aging; in alloys-1 & 2, **Cu** & **Mg** atoms segregating on unfaulted & orthorhombic, prismatic dislocation loops cause the formation of heterogeneous S' (Al2CuMg) ppts. on these dislocation loops during the same heat treatment.

Examiner's Copy

AN 118:85846 HCA
TI **Aluminum-lithium**-zinc alloys for extruded parts having a low aspect ratio
IN Witters, Jeffrey J.; Cheney, Brian A.; Rioja, Roberto J.
PA Aluminum Co. of America, USA
SO PCT Int. Appl., 21 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9212269	A1	19920723	WO 1991-US9808	19911227
	W: JP				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE				
	US 5151136	A	19920929	US 1990-634901	19901227
	EP 517884	A1	19921216	EP 1992-902697	19911227
	R: DE, FR, GB				
	JP 05505854	T2	19930826	JP 1992-502886	19911227
PRAI	US 1990-634901	19901227			
	WO 1991-US9808	19911227			

AB The **Al** alloys having extruded length/thickness ratio of 1-2.5 contain **Li** 0.2-5.0 and Zn 0.05-12.0 (esp. 0.05-1%) with **Mg** 0-5.0, **Cu** .ltoreq.6.5, Zr .ltoreq.1.0 Mn .ltoreq.2.0, Ag .ltoreq.2, Fe .ltoreq.0.5, and/or Si .ltoreq.0.5%. The preferred alloy contains **Li** 1.5-3.0, **Cu** 2.55-2.90, **Mg** 0.2-2.5, Zn 0.2-11.0, Zr 0.08-0.12, Mn 0-1.0, and Fe and Si impurities .ltoreq.0.1% each. The alloys optionally contain Cr, V, Sc, and/or Ti at 0.05-0.2, and/or Hf, Fe, Ni, Ag, and/or Mn at 0.05-0.6%. The starting alloy ingot can be preformed with .gtoreq.30% size redn., followed by heat treatment for 1-50 h at 400-1200.degree. prior to the extrusion stage. Tensile yield strength of the extrusions is .gtoreq.60 kpsi. Thus, the extruded billet was manufd. from the alloy contg. **Li** 2.17, **Cu** 2.79, Zn 0.49, **Mg** 0.25, Zr 0.07, Mn 0.35, and V 0.08%. After thermomech. treatment and final aging (30 h at 310 .degree.F), tensile strength was 78 kpsi, yield point 71.2 kpsi, and elongation 6.8%. Com. AA 2091 **Al** alloy after the same processing showed 70 kpsi, 69.4 kpsi, and 1.6% resp.

Examiner Copy

AN 110:139903 HCA
TI **Aluminum-lithium** alloy for flat-rolled product
IN Young, Kenton P.; Bowers, Joel A.; Colvin, Edward L.; Westerlund, Robert A.
PA Aluminum Co. of America, USA
SO Eur. Pat. Appl., 6 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 281076	A1	19880907	EP 1988-103080	19880301
	EP 281076	B1	19920520		
	R: CH, DE, ES, FR, GB, IT, LI, NL, SE				
	US 4790884	A	19881213	US 1987-20600	19870302
	CA 1308630	A1	19921013	CA 1988-560077	19880229
	JP 63235454	A2	19880930	JP 1988-49453	19880302
	BR 8800903	A	19881011	BR 1988-903	19880302
PRAI	US 1987-20600		19870302		

AB The **Al-Li** alloys for sheets or plates showing a good formability without Luder's line defect contain **Li** 0.5-4.0, **Cu** and **Mg** .ltoreq.5.0 each, Zr .ltoreq.1.0, Mn .ltoreq.2.0, Zn .ltoreq.7.0, Fe and Si .ltoreq.0.5% each, and preferably .ltoreq.0.35% impurities. A flat-rolled product is soln. heat treated and quenched; preaged at 150-270.degree.F for >6 h; stretched without forming the Luder's line defect; and then aged to stabilize mech. properties. Thus, cast alloy ingot (contg. **Li** 2.3, **Cu** 2.7, and Zr 0.1%) was heated for 24 h at 1000.degree.F for homogenizing, hot-rolled to 0.162 in. thickness, cut, and cold-rolled into strips 0.063 in. thick. The strips were heated for 60 min at 1020.degree.F, quenched in water, preaged at 230.degree.F for 100 h, and cooled in air. The strips were then stretched 1% without showing the Luder's line defect. Without the preaging treatment the stretched strips showed the defect.

Examiner's Copy

AN 90:126079 HCA
TI **Aluminum** alloy with improved weldability
IN Sperry, Philip R.; Mandigo, Frank N.
PA Swiss Aluminium Ltd., Switz.
SO Ger. Offen., 17 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2810932	A1	19781012	DE 1978-2810932	19780314
	US 4094705	A	19780613	US 1977-781718	19770328

PRAI US 1977-781718 19770328

AB High-strength formable **Al** alloy [**69508-78-7**] suitable for resistance welding contains **Mg** 2-4, **Li** 0.4-0.8, Mn 0.1-0.7, Fe .ltoreq.0.45, Si .ltoreq.0.45, **Cu** .ltoreq.0.2, Cr .ltoreq.0.4, Ti 0.1-0.2, Zn .ltoreq.0.3, Ni .ltoreq.0.3, V 0.05-0.15 and Zr .ltoreq.0.15%. The alloy contains **Li** in solid soln. and shows higher elec. resistance than **Li**-free alloys when rolled to sheet and annealed.

Examiner's Copy

AN 116:260506 HCA
TI Two-step aging of **aluminum-lithium** alloys
IN Rioja, Roberto J.; James, R. Steve
PA Aluminum Co. of America, USA
SO U.S., 10 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5076859	A	19911231	US 1989-457099	19891226

PI
AB The soln. treated articles from **Al-Li** alloys are aged in the 1st stage for 0.1-100 h at 250-415 .degree.F, and then in the 2nd stage (esp. for 1-1000 h) at 100-330 .degree.F for improved strength and fracture toughness. The heat treatment process is suitable for the **Al** alloys contg.: (a) **Li** 0.2-5.0, **Mg** 0-5.0, **Cu** .ltoreq. 5.0, Ag 0-2, Zr 0-1.0, Mn 0-1.0, Zn 0-9.0, Fe .ltoreq. 0.5, and/or Si .ltoreq. 0.5%; or (b) **Li** 0.5-4.0, **Mg** 0.1-6.0, **Cu** .gtoreq. 0.6, Zn 0.05-12, Mn 0-0.8, Zr .ltoreq. 0.15, Ag 0.05-1, Fe .ltoreq. 0.5, and/or Si .ltoreq. 0.5%. Thus, the strip specimens from AA 2090 alloy were aged at 300-310 .degree.F and then at 212-250 .degree.F, and showed high fracture toughness insensitive to the tensile yield strength of 72-80 kpsi. When the alloy was aged only at 325 .degree.F, the fracture toughness decreased with the higher yield strength of 70-77 kpsi.

AN 107:119640 HCA
TI **Aluminum-lithium** alloys and method of making the same
IN Cho, Chul Won
PA Aluminum Co. of America, USA
SO PCT Int. Appl., 46 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 8

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 8703011	A1	19870521	WO 1986-US2545	19861119
W: AU, BR, JP, NO				
RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE				
US 4806174	A	19890221	US 1985-793273	19851119
AU 8768381	A1	19870602	AU 1987-68381	19861119
BR 8606987	A	19871201	BR 1986-6987	19861119
EP 247181	A1	19871202	EP 1987-900418	19861119
EP 247181	B1	19911002		
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
JP 63501883	T2	19880728	JP 1987-500396	19861119
CA 1283565	A1	19910430	CA 1986-523324	19861119
NO 8702996	A	19870917	NO 1987-2996	19870717
PRAI US 1985-793273	19851119			
US 1984-594344	19840329			
WO 1986-US2545	19861119			

AB The low-d. alloys suitable for aircraft applications contain **Li** 0.5-4.0, **Mg** 0-5.0, **Cu** <5.0, Zr 0-1.0, Mn 0-2.0, Zn 0-7.0, and Fe and Si .ltoreq.0.5% each. A wrought product having an isotropic texture is manufd. by hot working into a preform without a dissoln. loss of grain-boundary ppts., followed by recrystn. of the preform and hot working for final shaping. The alloy is suitable for sheet manuf. and pptn. hardening. Thus, a cast ingot of **Al** alloy (contg. **Li** 1.73, **Cu** 2.63, and Zr 0.12%) was soaked 24 h at 1000.degree. F, and then hot-rolled into a plate (.apprx.0.25 in). The plate was soln.-treated 1 h at 1075.degree. F, quenched in water to 70.degree. F, and stretched for 2 or 6% elongation. Plate specimens were then heat-treated at 325 or 375.degree. F for artificial aging. Fracture toughness and tensile strength were improved more by stretch-forming for 6% than for 2%.

AN 104:23136 HCA
TI **Aluminum-lithium** alloys
IN Sawtell, Ralph R.; Bretz, Philip E.; Hunt, Warren H.
PA Aluminum Co. of America, USA
SO Eur. Pat. Appl., 23 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 8

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 157600	A2	19851009	EP 1985-302169	19850328
	EP 157600	A3	19870916		
	EP 157600	B1	19920701		
	R: CH, DE, FR, GB, IT, LI, NL, SE				
	US 4648913	A	19870310	US 1984-594344	19840329
	AU 8538094	A1	19851003	AU 1985-38094	19850125
	AU 573683	B2	19880616		
	CA 1228490	A1	19871027	CA 1985-475903	19850307
	NO 8501267	A	19850930	NO 1985-1267	19850328
	BR 8501422	A	19851126	BR 1985-1422	19850328
	JP 60221543	A2	19851106	JP 1985-66407	19850329
	US 4897126	A	19900130	US 1988-213722	19880630
	US 5135713	A	19920804	US 1990-588410	19900926
PRAI	US 1984-594344	19840329			
	US 1984-685731	19841224			
	US 1988-149802	19880128			
	US 1988-172506	19880324			

AB High toughness in combination with tensile strength is obtained in aircraft alloys contg. **Li** 0.5-4, **Mg** 0-5.0, **Cu** 0-5.0, Zr 0-1.0, Mn 0-2.0, Zn 0-7, Fe <0.5, and Si <0.5%. The wrought bar or strip is soln.-treated, quenched, stretched >3%, and aged at 150-400.degree.F. Tensile strength of 50-85 kpsi is typically achieved with fracture toughness 25-75 kpsi-in0.5. Thus, **Al** alloy ingot contg. **Li** 1.73, **Cu** 2.63, and Zr 0.12% was homogenized 24 h at 1000.degree.F, and hot-rolled into plates 1 in. thick. The plate was soln. heat treated 1 h at 1025.degree.F, quenched in water at 70.degree.F, stretched 2 or 6%, and aged at 325 or 375.degree.F. Tensile strength and fracture toughness were higher after stretching to 6%, compared with 2%.

Examiner's Copy

AN 124:124235 HCA
TI **Aluminum**-scandium alloys for welding rods and welded construction
IN Tack, William Troy; Hansson, Inge L. H.
PA Ashurst Corp., USA
SO PCT Int. Appl., 139 pp
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9532074	A2	19951130	WO 1995-US6684	19950524
	WO 9532074	A3	19960314		
	W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT				
	RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5620652	A	19970415	US 1995-410801	19950327
	AU 9526515	A1	19951218	AU 1995-26515	19950524
	EP 760727	A1	19970312	EP 1995-921434	19950524
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
	JP 10505282	T2	19980526	JP 1995-530546	19950524
	NO 9604958	A	19970114	NO 1996-4958	19961121

PRAI US 1994-249023 19940525
US 1995-410801 19950327
WO 1995-US6684 19950524

AB The Ce-contg. alloys with .gtoreq.60% **Al** are suitable for welding rods and welded construction, and typically contain Sc 0.02-10.0 (esp. 0.1-0.5) and Zr 0.05-0.22%. The welding process is suitable for manuf. of bicycle frames from tubular preforms. The typical **Al** alloys for structural applications contain **Cu** 1.5-3.1, **Mg** 1.0-2.1, Fe 0.5-1.7, Ni 0.6-1.5, Ti 0.04-0.10, Si 0.10-0.25, Sc 0.02-10.0, and Zr 0.1-1.0%. The **Al** alloys with **Li** typically contain **Cu** 3.5-5.5, **Li** 0.40-2.0, Ag 0.01-0.80, **Mg** 0.01-1.5, Sc 0.02-0.5, and Zr 0.0-1.0%. The **Al** alloys with Zn typically contain Zn 4.0-9.0, **Mg** 0.6-3.8, **Cu** 0.1-3.0, Sc 0.02-10.0, and optionally Zr 0.0-1.0%. The alloys are suitable for structural applications in transportation and sport-oriented equipment.

Examiner C S

AN 110:235863 HCA
TI Manufacture of high-strength **aluminum** alloy without solution treatment
IN Uno, Teruo; Hirano, Seiichi
PA Sumitomo Light Metal Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 01025954	A2	19890127	JP 1987-178850	19870720
	JP 03066387	B4	19911017		

AB The **Al** alloy for aircraft is manufd. from a billet contg. **Cu** 0.5-5.0, **Li** 0.5-4.0, **Mg** 0, 0.5-6.0, optional Cr 0.05-0.30, Mn 0.05-1.0, Zr 0.05-0.30, and/or V 0.05-0.30% by soaking at 520-550.degree. for 2-48 h, heating at 450-520.degree., extruding, air cooling, and artificially aging. Thus, a billet of the **Al** alloy contg. **Li** 2.1, **Cu** 2.7, Si 0.04, Fe 0.05, Ti 0.02, B 0.002, and Be 0.0005% was soaked at 530.degree., heated at 480.degree., extruded into a rod, cooled, and aged at 175.degree. to show tensile strength 47.0 kg/mm2, yield point 40.1 kg/mm2, and elongation 8%.

AN 124:295966 HCA
TI Crystallography of heterogeneous S' & T1 precipitates in double aged **Al**-**Cu**-**Mg**-(**Li**) Alloys
AU Oezbilen, Sedat
CS Teknik Egitim Fakultesi, Gazi Univ., Ankara, Turk.
SO Turk. J. Eng. Environ. Sci. (1996), 20(2), 103-12
CODEN: TJESEC; ISSN: 1300-0160
DT Journal
LA Turkish
AB Alloys prepd. with a chem. compn. of **Al**-2.11%**Cu**-0.93%**Mg** (alloy-1) and **Al**-2.07%**Cu**-0.97%**Mg**-0.87%**Li** (alloy-2) were subjected to homogenization, water-quenching, natural aging for 3.15 .times. 107s & artificial aging at 463K for 2.16 .times. 104s & 8.64 .times. 104s (double aging). Selected samples were examd. in detail under TEM. For this purpose, bright & dark field images together with electron diffraction patterns taken from [001], [011], [012] & [111]Al-matrix directions were used. It was obsd. that there was an effect of alloying elements, namely **Li**, **Cu**, **Mg** on the nature & d. of lattice defects of dislocation loop type in **Al**-matrix during heat treatments. In alloy-2, **Li** & **Cu** atoms segregating on Frank & double-arc contrast, prismatic loops cause the formation of T1 (Al2CuLi) ppts. during double aging; in alloys-1 & 2, **Cu** & **Mg** atoms segregating on unfaulted & orthorhombic, prismatic dislocation loops cause the formation of heterogeneous S' (Al2CuMg) ppts. on these dislocation loops during the same heat treatment.

Examiner's Copy

AN 124:124235 HCA
TI **Aluminum**-scandium alloys for welding rods and welded construction
IN Tack, William Troy; Hansson, Inge L. H.
PA Ashurst Corp., USA
SO PCT Int. Appl., 139 pp
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9532074	A2	19951130	WO 1995-US6684	19950524
	WO 9532074	A3	19960314		
	W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT				
	RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5620652	A	19970415	US 1995-410801	19950327
	AU 9526515	A1	19951218	AU 1995-26515	19950524
	EP 760727	A1	19970312	EP 1995-921434	19950524
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
	JP 10505282	T2	19980526	JP 1995-530546	19950524
	NO 9604958	A	19970114	NO 1996-4958	19961121

PRAI US 1994-249023 19940525
US 1995-410801 19950327
WO 1995-US6684 19950524

AB The Ce-contg. alloys with .gtoreq.60% **Al** are suitable for welding rods and welded construction, and typically contain Sc 0.02-10.0 (esp. 0.1-0.5) and Zr 0.05-0.22%. The welding process is suitable for manuf. of bicycle frames from tubular preforms. The typical **Al** alloys for structural applications contain **Cu** 1.5-3.1, **Mg** 1.0-2.1, Fe 0.5-1.7, Ni 0.6-1.5, Ti 0.04-0.10, Si 0.10-0.25, Sc 0.02-10.0, and Zr 0.1-1.0%. The **Al** alloys with **Li** typically contain **Cu** 3.5-5.5, **Li** 0.40-2.0, Ag 0.01-0.80, **Mg** 0.01-1.5, Sc 0.02-0.5, and Zr 0.0-1.0%. The **Al** alloys with Zn typically contain Zn 4.0-9.0, **Mg** 0.6-3.8, **Cu** 0.1-3.0, Sc 0.02-10.0, and optionally Zr 0.0-1.0%. The alloys are suitable for structural applications in transportation and sport-oriented equipment.

Examiner's Copy

AN 118:85846 HCA
TI **Aluminum-lithium**-zinc alloys for extruded parts having a low aspect ratio
IN Witters, Jeffrey J.; Cheney, Brian A.; Rioja, Roberto J.
PA Aluminum Co. of America, USA
SO PCT Int. Appl., 21 pp.
CODEN: PIXXD2

DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9212269	A1	19920723	WO 1991-US9808	19911227
	W: JP				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE				
	US 5151136	A	19920929	US 1990-634901	19901227
	EP 517884	A1	19921216	EP 1992-902697	19911227
	R: DE, FR, GB				
	JP 05505854	T2	19930826	JP 1992-502886	19911227
PRAI	US 1990-634901		19901227		
	WO 1991-US9808		19911227		

AB The **Al** alloys having extruded length/thickness ratio of 1-2.5 contain **Li** 0.2-5.0 and Zn 0.05-12.0 (esp. 0.05-1%) with **Mg** 0-5.0, **Cu** .ltoreq.6.5, Zr .ltoreq.1.0 Mn .ltoreq.2.0, Ag .ltoreq.2, Fe .ltoreq.0.5, and/or Si .ltoreq.0.5%. The preferred alloy contains **Li** 1.5-3.0, **Cu** 2.55-2.90, **Mg** 0.2-2.5, Zn 0.2-11.0, Zr 0.08-0.12, Mn 0-1.0, and Fe and Si impurities .ltoreq.0.1% each. The alloys optionally contain Cr, V, Sc, and/or Ti at 0.05-0.2, and/or Hf, Fe, Ni, Ag, and/or Mn at 0.05-0.6%. The starting alloy ingot can be preformed with .gtoreq.30% size redn., followed by heat treatment for 1-50 h at 400-1200.degree. prior to the extrusion stage. Tensile yield strength of the extrusions is .gtoreq.60 kpsi. Thus, the extruded billet was manufd. from the alloy contg. **Li** 2.17, **Cu** 2.79, Zn 0.49, **Mg** 0.25, Zr 0.07, Mn 0.35, and V 0.08%. After thermomech. treatment and final aging (30 h at 310 .degree.F), tensile strength was 78 kpsi, yield point 71.2 kpsi, and elongation 6.8%. Com. AA 2091 **Al** alloy after the same processing showed 70 kpsi, 69.4 kpsi, and 1.6% resp.

Examiner's Copy

AN 90:126079 HCA
TI **Aluminum** alloy with improved weldability
IN Sperry, Philip R.; Mandigo, Frank N.
PA Swiss Aluminium Ltd., Switz.
SO Ger. Offen., 17 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2810932	A1	19781012	DE 1978-2810932	19780314
	US 4094705	A	19780613	US 1977-781718	19770328

PRAI US 1977-781718 19770328
AB High-strength formable **Al** alloy [**69508-78-7**] suitable for resistance welding contains **Mg** 2-4, **Li** 0.4-0.8, Mn 0.1-0.7, Fe .ltoreq.0.45, Si .ltoreq.0.45, **Cu** .ltoreq.10.2, Cr .ltoreq.0.4, Ti 0.1-0.2, Zn .ltoreq.0.3, Ni .ltoreq.0.3, V 0.05-0.15 and Zr .ltoreq.0.15%. The alloy contains **Li** in solid soln. and shows higher elec. resistance than **Li**-free alloys when rolled to sheet and annealed.

Examiner: C.S

AN 110:235863 HCA
TI Manufacture of high-strength **aluminum** alloy without solution treatment
IN Uno, Teruo; Hirano, Seiichi
PA Sumitomo Light Metal Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 01025954	A2	19890127	JP 1987-178850	19870720
	JP 03066387	B4	19911017		

AB The **Al** alloy for aircraft is manufd. from a billet contg. **Cu** 0.5-5.0, **Li** 0.5-4.0, **Mg** 0, 0.5-6.0, optional Cr 0.05-0.30, Mn 0.05-1.0, Zr 0.05-0.30, and/or V 0.05-0.30% by soaking at 520-550.degree. for 2-48 h, heating at 450-520.degree., extruding, air cooling, and artificially aging. Thus, a billet of the **Al** alloy contg. **Li** 2.1, **Cu** 2.7, Si 0.04, Fe 0.05, Ti 0.02, B 0.002, and Be 0.0005% was soaked at 530.degree., heated at 480.degree., extruded into a rod, cooled, and aged at 175.degree. to show tensile strength 47.0 kg/mm2, yield point 40.1 kg/mm2, and elongation 8%.

low Li